
Juvenile Chinook Preferred Lakeshore and Ship Canal Habitat: 2002 Results

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In 2002, we continued our assessment of the habitat use of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) in the nearshore areas of Lake Washington, Lake Sammamish, and the Ship Canal. Juvenile Chinook salmon are found in Lake Washington and Lake Sammamish between January and July, primarily in the littoral zone. Research efforts in 2002 focused on juvenile Chinook salmon temporal and spatial distribution, shoreline structure use (woody debris and overhanging vegetation), use of non-natal tributaries, and hydroacoustics surveys.

We conducted nighttime snorkel surveys at 12 sites in south Lake Washington to examine the temporal and spatial distribution of juvenile Chinook salmon. From January to July, we surveyed four sites on the east shoreline, five on the west shoreline, and three on Mercer Island. From January to the beginning of June, the two sites closest to the Cedar River had substantially higher densities of Chinook salmon than the other sites. Overall, the abundance of Chinook salmon displayed a strong, negative relationship with the shoreline distance from the mouth of the Cedar River to each site. During the latter part of June, we observed fewer Chinook salmon but those that were observed were located primarily along the west shoreline. Juvenile Chinook salmon were present on Mercer Island on each survey date (March 24 – June 16). We found little difference between densities on Mercer Island and those on east and west shoreline sites that were a similar distance away from the Cedar River.

A woody debris experiment was conducted again in Gene Coulon Park; however, in 2002, we began the experiments earlier (beginning of March) and we used seven shoreline sections (three woody debris and four open or control sites) instead of four (two woody debris and two controls). Overall, we found little difference between woody debris sites and open sites; however, on a couple of dates in April, almost all of the Chinook salmon were located in the woody debris sites. For the most part, Chinook salmon during the day were observed on the outside edge of the woody debris piles and were active, but occasionally we observed groups of Chinook salmon that were inactive and located directly under the woody debris

In addition to woody debris experiments, we monitored two natural sites in south Lake Washington with woody debris and overhanging vegetation (WD/OHV). We compared areas with WD/OHV to adjacent sites without WD/OHV. Both sites were surveyed during the daytime once a week from March to June. Juvenile Chinook salmon were present at these sites from March to the middle of May. At both sites, juvenile Chinook salmon were more abundant at the WD/OHV locations. Over 80% of juvenile Chinook salmon were located at the WD/OHV sites. Chinook salmon were usually inactive and located within the WD/OHV.

We surveyed nine tributaries in south Lake Washington, four in north Lake Washington, and four in south Lake Sammamish. At each tributary, we surveyed four general habitat types, which included: a lake reference site, delta area, convergence pool, and lotic habitats (pools, glides, and riffles within the tributary). The reference site and delta were within the lake and the pools and

glides and convergence pool were in the tributary itself. The reference site was a nearby lake shoreline site that appeared to have good quality habitat for juvenile Chinook salmon. In comparison to lake reference sites, the delta sites had a higher density of juvenile Chinook salmon in 9 of 14 sites. On average, the delta sites had almost twice as many fish as the lake reference site. Deltas probably have good Chinook salmon habitat because they are shallow, have a gentle slope, and are composed primarily of sand. Of the other tributary habitats, Chinook salmon were most common in the convergence pools. Overall, Chinook salmon appeared to use tributaries that had low gradient, were relatively small and shallow, and were close to their natal stream (Cedar River or Issaquah Creek). Of the tributaries examined, Johns Creek was by far the most used by Chinook salmon. The peak number of Chinook salmon observed in an index area (lower 0.26 km) of Johns Creek was 387. Chinook salmon were observed as far upstream as 0.46 km from Lake Washington.

Preliminary hydroacoustics surveys were conducted in 2002 to assess this technique as a method of collecting habitat use information. Both fixed and mobile surveys (side-scanning sonar) were conducted in south Lake Washington and the Ship Canal (including Lake Union) to better understand the habitat use and movement patterns of Chinook salmon in May, June, and July when snorkeling does not appear to be a reliable method for collecting habitat use information. Fixed surveys at Gene Coulon Park indicated Chinook salmon were in shallow water (1-2 m depth) approximately 25-30 m from shore. We used nighttime snorkel data to estimate species composition. At Gas Works Park, most fish were further offshore in deeper water, approximately 35-60 m offshore in about 4-12 m deep water. Purse seine data (D. Seiler, WDFW) was used to estimate species composition. Mobile surveys of north Lake Union (including Gas Works Park) indicated fish were most abundant along the shore in 7-10 m deep water. Overall, hydroacoustics appeared to provide valuable information when coupled with other sampling techniques that estimate species composition.